Effectiveness of Workplace Interventions targeting return to work in patients with low back and neck pain: A systematic review

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Abstract

Background: Back and neck pain is among the most damaging issues to human health, economy and quality of life. Stakeholders have a large incentive to collaborate in research improving return to work. This study takes aim in mapping out the most important research on the efficacy of workplace interventions in the last 10 years.

Method: A literary search was conducted in MEDLINE through the PubMed search engine. The search was left intentionally broad using only the search MeSH terms low back pain OR neck pain AND return to work. The search yield was 300 articles. 66 articles were deemed satisfactory upon initial screen, and only 9 remained after thorough review.

Results: Out of the 9 included articles 3 described neck pain and 6 described low back pain. The studies on back pain predominantly measured the outcome in days of sick leave collected from social security registers. The studies naming their interventions “participatory ergonomics” proved the most effective at reducing sick leave.

Discussion: The overall aim of this review was to identify and summarize studies describing workplace interventions targeting return to work in patients with low back and neck pain. The search methodology and MeSH terms used failed to discover all the relevant articles they were intended to find. Lack of consensus on the definition of a “workplace intervention” made systematizing research difficult.

Background:

Back and neck pain is expensive. In Norway musculoskeletal diseases account for a third of disability pensions, where back and neck pain are the largest subgroups(1). This amounts to near 80 billion kr. In addition, near 40% of sickness absence is caused by musculoskeletal diseases, amounting to near 40 billion Norwegian kroner in expenses (2). The societal costs of back pain, sick leave and disability pensions are staggering, and are often the cause of debate in the Norwegian press.

The causes for back and neck pain are multifactorial (3-6). Psychosocial factors such as: high demand, low control, job insecurity and low co-worker support are associated with poor self-perceived health including back pain(7). A Dutch study found flexion and rotation of the trunk, lifting and low job satisfaction to be risk factors for sick leave among those with back pain(6). Sustained awkward postures and mouse/keyboard use from computer work are risk factors for neck pain (8) Consensus is close to being established on the causal relation of musculoskeletal disorders to occupational ergonomic stressors, such as repetitive and stereotyped motions, forceful exertions, non-neutral postures and vibration (4). Because of the multifactorial origins of back and neck pain, interventions have changed their focus from one dimensionally targeting the physical pain of the worker. Nowadays, the interventions have grown more complex. They are multidisciplinary, and physicians are no longer the only profession involved in removing the barriers prohibiting return to work.

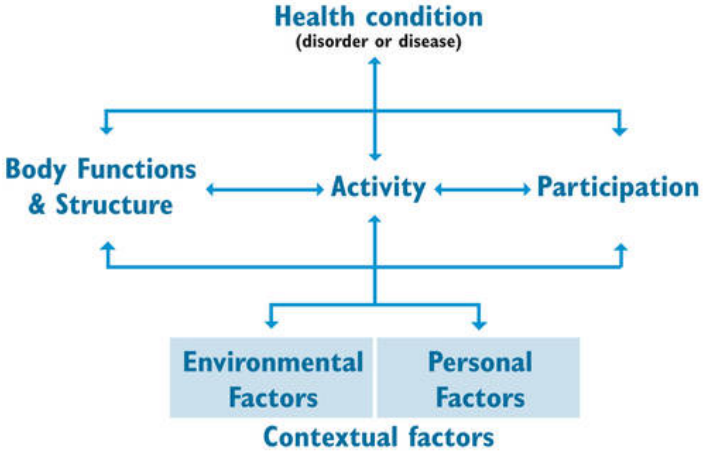
A recent meta-analysis(9) showed that 68.2% of workers sick listed from back pain returned to work after 1 month, 85.6% at 1-6 months and 93.3% after 12 months. These statistics showcase where interventions are most likely to have an effect, for both the patient and society. As the incentive for stakeholders for funding research is big, several different types of interventions have been carried out. None the less, return to work strategy is not a big part of the curriculum for medical students. Attaining and describing knowledge in this area has been the authors' primary motivation. I was inspired to discover more about multidisciplinary interventions, and more specifically workplace interventions, after learning about their effectiveness (10)

The International Classification of Functioning, Disability and Health (11)(ICF-model, Figure 1) was chosen as a framework to describe the content of the included interventions. This was done to take into account research (12) pointing to social and environmental factors as key components in work absenteeism. The ICF-model was designed to be a unifying framework for classifying the health components of functioning and disability. The broad assessment made possible by the ICF-model seems appropriate to describe a phenomenon as complex as neck and low back pain. Body functions, participation, activities, environmental factors and personal factors are the five domains in the ICF. Together, these domains elaborate on the bio-psycho-social model, and put the patient in an even larger context. This allows for a nuanced understanding of the disabilities, limitations and restrictions hindering the individual in pursuing an active work life. The domains of the ICF-model briefly explained:

- **Body functions and structures.** The physiological functions of body systems, including psychological functions.
- **Participation** is the involvement in a life situation.
- **Activities**, the execution of a task or the action by an individual.

- **Environmental factors** make up the physical, social and attitudinal environment in which people live and conduct their lives.
- **Personal factors** are the particular background of an individual life and living.

Figure1: Interaction of the domains of the ICF model



Thus the two main goals of this review are:

-To identify studies describing workplace interventions targeting return to work in patients with low back and neck pain and their effectiveness.

-To describe the interventions according to which domains of the ICF-model they intervene upon.

Methods:

A search was conducted on February 27th 2014. 300 studies were initially found searching exclusively in PubMed, with the MeSH terms "low back pain" OR "neck pain" AND "return to work" from 2000-2014. The search strategy was made this broad as to include several different types of workplace interventions, even those not labelling them selves as such. The search strategy can be found in appendix 2.

The exclusion criteria were:

1. No intervention described.
2. Not assessing a workplace intervention.
3. Not assessing return to work or sickness absence as outcome.
4. Not including subjects with unspecific low back pain/neck pain.
5. Study designs other than RCT.
6. Language not English.

A question (PICO) was formulated: “How effective are workplace interventions at reducing sickness absence/increasing return to work in patients with low back and/or neck pain?” It is elaborated in the table below.

	Inclusion criteria	Exclusion criteria
Population	Patients with low back or neck pain	Other diagnoses
Intervention	Workplace intervention	Intervention other than workplace intervention
Control/comparison	Usual care or other intervention	No intervention
Outcome	Return to work, Sickness absence	All other outcomes
Study design	RCT	Other study designs

A workplace intervention was defined as any intervention focusing on changes in the workplace, working equipment, work design, work organization, working relationships, work conditions or work environment. Occupational case management with active stakeholder involvement of worker/employer was also included. Calls made to the workplace if the study otherwise fit with the definition were accepted. Emphasis was put on the assessment of the workplace intervention itself, as well as the direct impact it had on the outcome. Studies that included workplace interventions as a non-measurable component of a larger scale intervention were excluded.

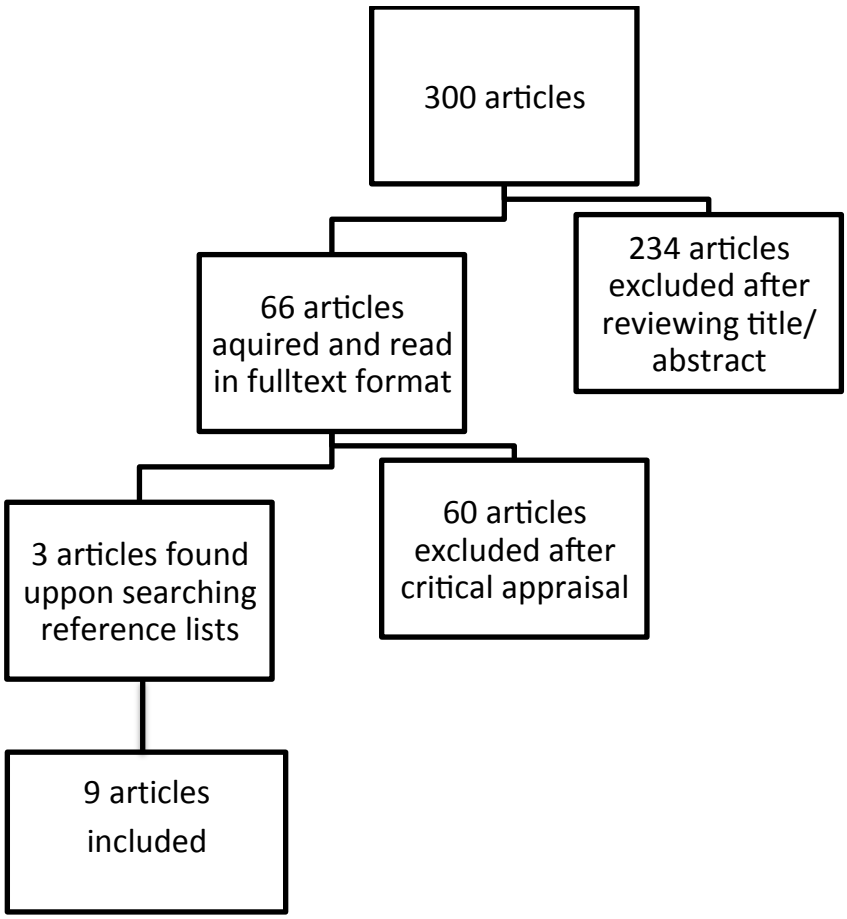
234 articles were excluded after reading title & abstract of the initial search yield. 175 of the articles were excluded because of intervention type (not workplace intervention), 33 were not

describing neck or back pain, 11 were not English, 10 were because of study design, and the remaining 5 were not assessing return to work.

The 66 articles that were left were read in their entirety, checking reference lists for relevant articles. 3 new articles were found in this process. After which additionally 60 articles where excluded. 30 on the basis of their intervention, 13 because of study design, 8 because they were not describing an intervention, and 7 because they were describing the same study, one because it was not assessing return to work and an additional one was excluded because it was not assessing low back/neck pain.

The remaining 9 articles were deemed satisfactory for further review. The process is illustrated in Figure 2.

Figure 2: The inclusion/exclusion process.



In cases where a particular form of intervention encompassed more than one domain of the ICF-model, the intervention was categorized into whichever domain it primarily intervened upon. Ex: Education on body posture primarily influences the body functions and structures domain and was categorized as such, although it may or may not secondarily improve participation. The participation and activities domains were merged into one category. These two domains influence each other so heavily that it posed a practically impossible task to divide them. Below follows a short description with examples of how the domains are understood in relation to the interventions:

- Body functions and structures: Education on management of stress, optimal body posture, changing posture/working position.
- Participation & Activities: Graded activity, workload modifications, taking breaks, working methods/techniques, lifting/pushing/pulling technique sick leave, active sick leave and change of work hours.
- Environmental Factors: Physical changes of the workstation, implementation of new equipment, changes addressing communication between workers and/or management, workplace attitudes or workplace culture.
- Personal factors: Adaption of life cycle, changing habits, making age related adjustments, lifestyle changes.

Results:

Three RCTs assessing neck pain and six RCTs targeting low back pain were found (showcased in Table 1). Among the articles, a few of the publications (13-15) and (16, 17) were covering one larger study. To avoid repetition, only one of the respective articles (15, 16)will serve as a main example for the others.

Risk of Bias in included Articles:

Risk of bias was assessed using a checklist based on the Cochrane Handbook: Risk of bias assessment tool. This version was suggested by the Cochrane Back group(18). If information was not found in the included article, other articles or homepages elaborating on the study were reviewed. All of the included studies shared in common a lack of blinding of the care provider as well as the patient. None the less, all studies had 8 or more marks checked as “yes” in the checklist. A full evaluation of risk of bias can be found in Appendix 1.

Intervention types:

Two of the articles found described studies assessing participatory ergonomics (15, 19). Another two based themselves on interventions employing occupational physicians (16, 20). The interventions targeted all the domains of the ICF-model except for personal factors (Table 2).

Body functions:

- Active workshop identifying mental workload (19).
- Active workshop with ergonomic identification of risks and problems and planning solutions (19).
- Education on posture (15) or workshop to this effect (21).
- Workshops increasing awareness and of coping with high work demands
- Consultations with physiotherapists (16).

Activities & Participation

- Implementation of ergonomic changes (19).
- Advice on handling loads and excessive use of strength (15, 20).
- Workshop increasing awareness of taking breaks (21).
- Meetings at the workplace with case manager assessing work history, private life and perception of pain and disability. Tailor made rehabilitation plan formulated in cooperation with the patient to remove barriers stopping RTW (16).
- Modifying work demands (20).

Environmental

- Implementation of ergonomic solutions(19)
- Interventions targeted at equipment used (15).
- Changes of computer angles to acquire high (15º lower than horizontal eye line) or low(30º lower than horizontal eye line) line of sight(22)
- Case manager contacted social service centre if necessary(16)
- Occupational physician addressing supervisors or colleagues when working with barriers concerning ergonomic adaptions.(20)
- Advice or consulting employer concerning barriers prohibiting RTW (20)

Measures of outcome:

The low back pain studies (13-16, 20) generally measured their primary outcomes in the form of days of sick leave, time until sustained return to work and hazard ratios through cox regression analysis. Data was collected directly from the social security services in order to minimize bias. Three of the studies used questionnaires to document their outcomes (19, 21, 22). One measured self reported disability and recovery from symptoms (21).

Automatic gathering of sick leave data from the Dutch social security system was used in the first study (15). The outcome was measured as duration of sick leave in calendar days from the first day of sick leave, until lasting (minimum 4 weeks) return to work was established. Total days of sick leave in the 12-month follow up were also calculated. Bernaards (21) used a questionnaire evaluating the last 4 weeks. Self-reported disability at work with an 11-point numerical scale was assessed, as well as the degree of recovery from symptoms from neck/shoulder region on a 7-point VAS-scale. Fostervold (22) reported total days of sick leave in the past 6 months after a total 12 months of the intervention in their questionnaire. Reports of sick leave (yes/no) in the last 3 months (at 3, 6, 9 and 12 months) were used in a Finnish study (19). Jensen C et al (16) defined RTW as a 4-month period where the worker did not collect social transfer payments. Data was collected on a weekly basis from the Danish social security system. The last study (20) measured both time until return to work after a one year follow up period, time until recurrence, total number of days lost over 1-year period for any reasons as well as days specifically lost due to LBP.

Effectiveness of the Interventions:

One included paper describing neck pain (23) found effectiveness of the intervention only at the 6 month follow up. The 3-, 9- and 12-month follow-ups did not show any statistically significant findings. One of the Dutch RCTs (15) on lower back pain found that median time until lasting return was significantly lower in the intervention group. 77 days compared to 104 days for the control group ($p=0.02$). In a cox regression analysis analysing the total number of sick leave days in the intervention group compared to usual care, the hazard ratio was 1.7 (95% CI 1.2-2.3, P=0,003) in favour of the intervention group. Workers not resuming sustained (4 weeks) work during the 12-month follow up were 9 (9.4%) in the intervention group, and 17 (17.2%) in the control group.

Changes in recovery of symptoms after 12 months of follow up were more favourable in the intervention groups with neck and shoulder pain than in the usual care group in the case of Bernards. Odds ratios at 6 months 3.10 (95% CI 1.53;6.29 $p<0.05$) and 12 months 2.94(95%CI 1.13;6.58 $p<0.05$). No data on the self perceived disability for the neck/shoulder group was published, and the results for the entire population were not significant.

Low line of sight group showed days of sick leave to be 4.11 compared to a previous 4.21. In the high line of sight group the days of sick leave increased from 2.74 to 5.54. A two-factor analysis of variance showed the latter to have a significant group by time interaction ($p=0.021$).

The included Danish study (16) showed similar results for the brief and multidisciplinary interventions at the first and second year follow up. 140 (80%) participants in the brief intervention group and 136 (77%) in the multidisciplinary intervention group achieved return to work at the final follow up (17). Median time until return to work for the first and second intervention group was 14 and 18 weeks respectively.

Verbeek et al(20) observed a median time until return to work of 56 calendar days: 51 days for the intervention group and 62 days for the reference group. The hazard ratio for return to work was 1.3 (95% CI.90- 1.9), and not significant. 34% of the patients (n=41) did not achieve return to work in 3-months: 31% in the intervention group and 37% in the reference group. Odds ratio for rate of return to work at 3 months was 0.77 (95% confidence interval, 0.36–1.6). Mean and total duration of sick leave did not differ between groups at 12-month follow up.

Table 1: An overview of the included publications.

Author/year	Title	Target group	Intervention type	Outcome	Efficacy	Study size
Anema, 2007	Multidisciplinary rehabilitation for subacute low back pain: graded activity or workplace intervention or both? A randomized controlled trial	Nonspecific LBP, full or partial sick leave lasting 2-6 weeks, age 18-65.	Participatory ergonomics and meeting with stakeholders.	-Days of sick leave until 4 weeks of RTW in own/equal work without full/partial dropout. -Total 12 month sick leave	WI superior to no intervention. Hazard ratio for RTW 1.7, 95% CI 1.2-2.3 in favour of intervention group	196
Bernaards, 2007	The effectiveness of a work style intervention and a lifestyle physical activity intervention on the recovery from neck and upper limb symptoms in computer workers	Office computer workers from 7 of the largest companies in the Netherlands branches. Patients grouped either in neck and shoulder pain or arm/wrist/hand pain	Work style intervention targeting behavioural changes with regard to body posture, workplace adjustment, breaks and coping with high work demands. 6 interactive group meetings in a 6-month time period.	Questionnaire: -Disability at work during the last 4 weeks: 11-point numerical scale - Degree of recovery from symptoms from neck/shoulder region 7-point VAS-scale.	Changes in recovery and disability at work after 12 months of follow up were more favourable in the intervention groups than in the usual care group. Odds ratios at 6 months (T1) and 12 months (T2). Recovery: T1: 3.10(1.53;6.29) T2: 2.94(1.13;6.58) $p<0.05$	466
Fostervold, 2006	Work with visual display units: Long-term health effects of high and downward line-of-sight in ordinary office environments	Office computer workers	Change of computer visual display to either high line of sight or low line of sight.	Questionnaire reporting days sick leave and musculoskeletal discomfort in the past 6 months after a total 12 months of the intervention.	LLS group showed days of sick leave to be 4.11 compare to a previous 4.21. In the HLS group the days of sick leave increased from 2.74 to 5.54. A two factor analysis of variance showed the latter to have a significant group by time interaction (p=0.021)	150
Haukka 2008	A randomised controlled trial on whether a participatory ergonomics intervention could prevent musculoskeletal	Kitchen workers with MSD.	4 components: 1: mental health education 2: physical health education, relation and breaks 3: activity modifications 4: physical	Questionnaire: -Presence of neck pain?(along with 6 other anatomical sites) -Sick leave in the past 3 months:	Reduction of sick leave in the intermediate term (6 months) OR 0.56, 95% CI 0,33-0,95, but not in the short or long term (3 and 12 months).	415

	disorders		environmental modifications	yes/no		
Jensen C, 2011	One-year follow-up in employees sick-listed because of low back pain: randomized clinical trial comparing multidisciplinary and brief intervention	Sick listed workers with LBP, patients with radiculopathy not excluded.	Both groups received a brief intervention with a GP and a physiotherapist The second group got an additional intervention consisting of interview with a case manager at the workplace. A RTW-plan was subsequently made with follow-ups by a multidisciplinary team every other week.	RTW defined as a 4-month period where the worker did not collect social transfer payments. Data collected on a weekly basis from the Danish social security system.	133 (76.0%) participants in the brief intervention group and 125 (71.0%) participants in the multidisciplinary intervention group returned to work. Median time until RTW was 14 weeks in the former and 18 weeks in the latter The HR between the two intervention groups was 0.83 (95% CI: 0.65–1.06, P = 0.14)	351
Jensen C, 2012	Sustainability of return to work in sick-listed employees with low-back pain. Two-year follow-up in a randomized clinical trial comparing multidisciplinary and brief intervention	Sick listed workers with LBP, patients with radiculopathy not excluded.	Two groups with brief intervention. One group getting a workplace targeted multidisciplinary intervention in addition.	RTW defined as a 4-month period where the worker did not collect social transfer payments. Data collected on a weekly basis from the Danish social security system.	140(80%) participants in the brief intervention group and 136(77%) in the multidisciplinary intervention group achieved RTW at the two-year follow up.	351
Lambeek, 2010	Randomized controlled trial of integrated care to reduce disability from chronic low back pain in working and private life	Workers sick listed for minimum 12 weeks due to LBP	Intervention consisting of a participatory workplace interventions and a later graded activity program	Return to work defined as a 4-week period without sick leave from LBP.	Median duration until RTW was 88 days in the integrated care group compared with 208 days in the usual care group (P=0.003). Integrated care was effective on return to work (hazard ratio 1.9, 95% confidence interval 1.2 to 2.8, P=0.004).	134
Steenstra, 2006	The effectiveness of graded activity for low back pain in occupational healthcare					
Verbeek, 2002	Early occupational health management of patients with back pain: a randomized controlled trial	Patients with LBP	OP assessed: Disabilities, heavy work, organizational problems, psychosocial problems and inadequate treatment. In the case of a disparity between the worker's abilities and the work demands, the OP was to advise about exercise and education, modifying the work demands or advising/consulting employer.	Primary outcome: Time until return to work after a one-year follow-up period. Time until recurrence, total number of days lost over 1-year period for any reasons as well as specifically due to LBP.	The median time until return to work was 56 calendar days: 51 days for the intervention group and 62 days for the reference group. The hazard ratio of 1.3 (95% CI.90- 1.9) for RTW was not significant. 34% of the patients (n=41) did not achieve RTW in 3-months: 31% in the intervention group and 37% in the reference group. OR for rate of return to work at 3 months was 0.77 (95% confidence interval, 0.36–1.6). Mean and total duration of sick leave did not differ	120

					between groups at 12-month follow-up.	

Legend:
WI: Workplace Intervention
MSD: Musculoskeletal disorder
LBP: Low back pain
OP: Occupational physician

Table 2: The interventions described through use of the ICF-model.

Study	Intervention	Control	Interventions targeting body functions/structures	Interventions modifying activities and participation	Interventions modifying environment
Anema 2007	Participatory ergonomics	Usual care and graded activity	Education on posture	Advice on handling loads, excessive use of strength	Intervention targeted at equipment used
Bernaards 2007	Two intervention groups. Both included a work style group. One had a lifestyle physical activity group in addition.	No intervention	Increasing awareness of coping with high work demands and learning to adjust to this. Physical activity group had extra education on physical activity outside workplace	Increasing awareness of taking breaks.	
Fostervold 2006	Adjustment of computer visual display angle acquire low line of sight. New desks were given to this group.	Adjustment of computer visual display angle acquire high line of sight.			Computer visual displays were altered to specific angles to ensure correct angles: 15º lower than horizontal line to the midpoint of the screen for one, and 30 ºfor the other.
Haukka 2008	Participatory ergonomics	Usual care or other intervention	Active workshop identifying mental workload and ergonomic risks/problems	Implementation of ergonomic changes	Implementation of ergonomic solutions
Jensen C 2011	Brief intervention + Hospital based Multidisciplinary intervention	Brief intervention	Physiotherapy sessions (both intervention groups)	Meetings at the workplace with case manager assessing work history, private life and perception of pain and disability. Tailor made rehabilitation plan formulated in cooperation with the patient to remove barriers stopping RTW. The case manager contacted social service centre if necessary.	

Verbeek 2002	Occupational intervention	Usual care		If necessary: Advice from occupational physician on modifying work demands and contact with employer. Advice on handling heavy loads and excessive use of strength if necessary.	Meeting with case manager. If necessary OP should consider supervisors or colleagues when addressing for example barriers concerning ergonomic adaptions.

Discussion:

It was surprising to find only two studies on participatory ergonomics, especially considering it has been 18 years since the publishing of the 1997 article by Loisel et al (24).

The initial literary search found several articles describing interventions that included workplace interventions. Newer studies on multidisciplinary interventions, functional restoration programs (25-28), graded activity (29) and behavioural/cognitive therapy (30) including workplace interventions have indeed been conducted. Data on the number of participants receiving the workplace intervention and the direct effect on the outcome were not collected or published. This unfortunate fact made them irrelevant for the purpose of this review.

Disappointingly, the literary search conducted did not find the relevant RCTs on neck pain described in a recent systematic review on neck pain by Aas et al (23). This discredits the search conducted. The narrow scope of the search (particularly using the keyword: “return to work”), and not contacting the original authors for additional data displays two big flaws of the methodology used in this review. The studies on neck pain found after conducting the initial search typically assessed pain as the only outcome (31), and it would appear as studies on neck pain and work absenteeism is lagging behind its bigger brother: lower back pain.

A newly published RCT on low back pain was also missed (32) as an effect of the applied search strategy (Appendix 2). It appears that this happened because of the PubMed filters applied to limit the search by study design. The RCT in question was not categorized as an RCT, and only appeared when applying the filter “research non us government”. This illustrates a concern with applying filters when searching in large databases.

The definition of a “workplace intervention” varies considerably according to several notable authors in this area of research (23, 33, 34). These variations in definition, along with the lack of an inclusive MeSH term describing work absenteeism made it difficult to limit the search strategy appropriately.

The methodological quality and risk of bias in the studies found was deemed satisfactory, but having only author with limited experience is a flaw.

In some cases details about how the intervention was carried out was hard to find. As such important information about the interventions may have been missed. This can again be attributed to the aforementioned weakness of this review concerning contacting authors. Egan et al argues that this is an inexpedient trend in workplace intervention publications(35).

A systematic review on neck pain conducted by Aas et al (23) included the studies of Haukka, Bernaards and Fostervold, and a meta-analysis. The measure of outcome was a questionnaire only reporting yes/no at quarterly intervals. It is the opinion of the author that such an

outcome measure makes it difficult to say something conclusive about the effect of the intervention on work absenteeism in general. Questions concerning the amounts of sick leave in these periods remain unanswered. Was the sick leave full/partial? Without these data, no conclusion on cost effectiveness can be made. It seems difficult to recommend participatory ergonomics as a superior alternative compared to other interventions for reducing sick leave due to neck pain. A significant effect on a decent population size (n=416) was found none the less, and further research with better outcome measures is warranted.

One of the RCTs found (15) on lower back pain, is a replicative study that attempts to put the Canadian Sherbrooke study(24) into a Dutch context. In this regard it successful. The similarity of the results strengthens the evidence for the efficacy of participatory ergonomics. Only having a 12-month follow up period, leaves something to be desired as to whether the intervention leaves a lasting impact or not. The size of the material is sufficient to appreciate that workplace interventions are probably likely to be effective interventions in the Canadian and Dutch socioeconomic setting, but the evidence can not quite yet be considered to be mounting (n=130 and 196 respectively). Differences of social security systems have an impact on the prognosis for return to work (12). As such it is difficult to know if the success in these two studies is generalizable to other countries.

The author found no reviews with the exact same purpose as this one, but reviews with broader scopes were found (10, 23, 33, 36).

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Appendix 1

🟢=Yes 🟡=Unclear 🔴=No

Figure 3. Evaluation of risk of bias: Anema 2007

1. Was the method of randomization adequate?	🟢
2. Was the treatment allocation concealed?	🟢
3. Was the patient blinded to the intervention?	🔴
4. Was the care provider blinded to the intervention?	🔴
5. Was the outcome assessor blinded to the intervention?	🟢
6. Was the drop-out rate described and acceptable?	🟢
7. Were all randomized participants analysed in the group to which they were allocated?	🟢
8. Are reports of the study free of suggestion of selective outcome reporting?	🟢
9. Were the groups similar at baseline regarding the most important prognostic indicators?	🟢
10. Were co-interventions avoided or similar?	🔴
11. Was the compliance acceptable in all groups?	🟡

12. Was the timing of the outcome assessment similar in all groups?	●

Figure 4. Evaluation of risk of bias: Bernards 2007

1. Was the method of randomization adequate?	●
2. Was the treatment allocation concealed?	●
3. Was the patient blinded to the intervention?	●
4. Was the care provider blinded to the intervention?	●
5. Was the outcome assessor blinded to the intervention?	●
6. Was the drop-out rate described and acceptable?	●
7. Were all randomized participants analysed in the group to which they were allocated?	●
8. Are reports of the study free of suggestion of selective outcome reporting?	●
9. Were the groups similar at baseline regarding the most important prognostic indicators?	●
10. Were co-interventions avoided or similar?	●
11. Was the compliance acceptable in all groups?	●
12. Was the timing of the outcome assessment similar in all groups?	●

Figure 5. Evaluation of risk of bias: Fostervold 2008

1. Was the method of randomization adequate?	●
2. Was the treatment allocation concealed?	●
3. Was the patient blinded to the intervention?	●
4. Was the care provider blinded to the intervention?	●
5. Was the outcome assessor blinded to the intervention?	●
6. Was the drop-out rate described and acceptable?	●
7. Were all randomized participants analysed in the group to which they were allocated?	●
8. Are reports of the study free of suggestion of selective outcome reporting?	●
9. Were the groups similar at baseline regarding the most important prognostic indicators?	●
10. Were co-interventions avoided or similar?	●
11. Was the compliance acceptable in all groups?	●

12. Was the timing of the outcome assessment similar in all groups?	●

Figure 6. Evaluation of risk of bias: Haukka 2008

1. Was the method of randomization adequate?	●
2. Was the treatment allocation concealed?	●
3. Was the patient blinded to the intervention?	●
4. Was the care provider blinded to the intervention?	●
5. Was the outcome assessor blinded to the intervention?	●
6. Was the drop-out rate described and acceptable?	●
7. Were all randomized participants analysed in the group to which they were allocated?	●
8. Are reports of the study free of suggestion of selective outcome reporting?	●
9. Were the groups similar at baseline regarding the most important prognostic indicators?	●
10. Were co-interventions avoided or similar?	●
11. Was the compliance acceptable in all groups?	●
12. Was the timing of the outcome assessment similar in all groups?	●

Figure 7. Evaluation of risk of bias: Jensen C 2011/2012

1. Was the method of randomization adequate?	●
2. Was the treatment allocation concealed?	●
3. Was the patient blinded to the intervention?	●
4. Was the care provider blinded to the intervention?	●
5. Was the outcome assessor blinded to the intervention?	●
6. Was the drop-out rate described and acceptable?	●
7. Were all randomized participants analysed in the group to which they were allocated?	●
8. Are reports of the study free of suggestion of selective outcome reporting?	●
9. Were the groups similar at baseline regarding the most important prognostic indicators?	●
10. Were co-interventions avoided or similar?	●
11. Was the compliance acceptable in all groups?	●

12. Was the timing of the outcome assessment similar in all groups?	●

Figure 8. Evaluation of risk of bias: Lambeek 2010

1. Was the method of randomization adequate?	●
2. Was the treatment allocation concealed?	●
3. Was the patient blinded to the intervention?	●
4. Was the care provider blinded to the intervention?	●
5. Was the outcome assessor blinded to the intervention?	●
6. Was the drop-out rate described and acceptable?	●
7. Were all randomized participants analysed in the group to which they were allocated?	●
8. Are reports of the study free of suggestion of selective outcome reporting?	●
9. Were the groups similar at baseline regarding the most important prognostic indicators?	●
10. Were co-interventions avoided or similar?	●
11. Was the compliance acceptable in all groups?	●
12. Was the timing of the outcome assessment similar in all groups?	●

Figure 9. Evaluation of risk of bias: Steenstra 2006

1. Was the method of randomization adequate?	●
2. Was the treatment allocation concealed?	●
3. Was the patient blinded to the intervention?	●
4. Was the care provider blinded to the intervention?	●
5. Was the outcome assessor blinded to the intervention?	●
6. Was the drop-out rate described and acceptable?	●
7. Were all randomized participants analysed in the group to which they were allocated?	●
8. Are reports of the study free of suggestion of selective outcome reporting?	●
9. Were the groups similar at baseline regarding the most important prognostic indicators?	●
10. Were co-interventions avoided or similar?	●
11. Was the compliance acceptable in all groups?	●

12. Was the timing of the outcome assessment similar in all groups?	●

Figure 10. Evaluation of risk of bias: Verbeek 2002

1. Was the method of randomization adequate?	●
2. Was the treatment allocation concealed?	●
3. Was the patient blinded to the intervention?	●
4. Was the care provider blinded to the intervention?	●
5. Was the outcome assessor blinded to the intervention?	●
6. Was the drop-out rate described and acceptable?	●
7. Were all randomized participants analysed in the group to which they were allocated?	●
8. Are reports of the study free of suggestion of selective outcome reporting?	●
9. Were the groups similar at baseline regarding the most important prognostic indicators?	●
10. Were co-interventions avoided or similar?	●
11. Was the compliance acceptable in all groups?	●
12. Was the timing of the outcome assessment similar in all groups?	●

Appendix 2:
The search was conducted in MEDLINE on 27.02.2015.

Search profile: (((low back pain) OR neck pain) AND return to work)

Filters: Clinical Trial; Review; Meta-Analysis; Systematic Reviews; Randomized Controlled Trial; Publication date from 2000/01/01 to 2014/12/31

MeSH entry Terms for "low back pain":

Back Pain, Low
Back Pains, Low
Low Back Pains
Pain, Low Back
Pains, Low Back
Lumbago
Lower Back Pain
Back Pain, Lower
Back Pains, Lower
Lower Back Pains

Pain, Lower Back
Pains, Lower Back
Low Back Ache
Ache, Low Back
Aches, Low Back
Back Ache, Low
Back Aches, Low
Low Back Aches
Low Backache
Backache, Low
Backaches, Low
Low Backaches
Low Back Pain, Recurrent
Recurrent Low Back Pain
Low Back Pain, Postural
Postural Low Back Pain
Low Back Pain, Mechanical
Mechanical Low Back Pain
Low Back Pain, Posterior Compartment

MeSH entry terms for "neck pain":

Neck Pains
Pain, Neck
Pains, Neck
Neck Ache
Ache, Neck
Aches, Neck
Neck Aches
Cervicalgia
Cervicalgias
Cervicodynia
Cervicodynias
Neckache
Neckaches
Cervical Pain
Cervical Pains
Pain, Cervical
Pains, Cervical
Posterior Cervical Pain
Cervical Pain, Posterior
Cervical Pains, Posterior
Pain, Posterior Cervical
Pains, Posterior Cervical
Posterior Cervical Pains
Posterior Neck Pain
Neck Pain, Posterior
Neck Pains, Posterior
Pain, Posterior Neck
Pains, Posterior Neck

Posterior Neck Pains
Anterior Cervical Pain
Anterior Cervical Pains
Cervical Pain, Anterior
Cervical Pains, Anterior
Pain, Anterior Cervical
Pains, Anterior Cervical
Anterior Neck Pain
Anterior Neck Pains
Neck Pain, Anterior
Neck Pains, Anterior
Pain, Anterior Neck
Pains, Anterior Neck

MeSH entry terms for "return to work":

Work, Return to
Return-to-Work
Back to Work
Work, Back to
Back-to-Work